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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|---|---|---|---|---|
| 10/633,258 | 08/01/2003 | David Dice | SUN03-09(030125) | 4788 |

7590           04/06/2007

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| EXAMINER |
|---|
| BATAILLE, PIERRE MICHE |

| ART UNIT | PAPER NUMBER |
|---|---|
| 2186 | |

| SHORTENED STATUTORY PERIOD OF RESPONSE | MAIL DATE | DELIVERY MODE |
|---|---|---|
| 3 MONTHS | 04/06/2007 | PAPER |

**Please find below and/or attached an Office communication concerning this application or proceeding.**

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

PTOL-90A (Rev. 10/06)

| | Application No. | Applicant(s) |
|---|---|---|
| **Office Action Summary** | 10/633,258 | DICE, DAVID |
| | Examiner | Art Unit | |
| | Pierre-Michel Bataille | 2186 | |

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
  Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☒ Responsive to communication(s) filed on <u>08 January 2007</u>.

2a)☒ This action is **FINAL**.      2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4)☒ Claim(s) <u>1-49</u> is/are pending in the application.

     4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) <u>20-23,43-46,48 and 49</u> is/are allowed.

6)☒ Claim(s) <u>1,2,6,24,25,29 and 47</u> is/are rejected.

7)☒ Claim(s) <u>3-5,7-19,26-28 and 30-42</u> is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

**Application Papers**

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

     Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

     Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

     a)☐ All   b)☐ Some * c)☐ None of:

         1.☐ Certified copies of the priority documents have been received.

         2.☐ Certified copies of the priority documents have been received in Application No. _____.

         3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

     * See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

1)☐ Notice of References Cited (PTO-892)

2)☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3)☐ Information Disclosure Statement(s) (PTO/SB/08)
     Paper No(s)/Mail Date _____.

4)☐ Interview Summary (PTO-413)
     Paper No(s)/Mail Date. _____.

5)☐ Notice of Informal Patent Application

6)☐ Other: _____.

## DETAILED ACTION

1.      The present Office action is taken in response to Applicant's communication

failed January 8, 2007 responding to Non-Final Rejected dated October 6, 2008.

Applicant's amendments and/or arguments have been considered with the results that

follow.

2.      Claims 1-49 are pending in the application under prosecution.

### *Response to Arguments*

Applicant's arguments filed January 8, 2007 have been fully considered but they

are not persuasive.

The October 6 2007 Office Action rejected claims 1-2, 6, 24-25, 29 and 47

with anticipated by Applicant Admitted Prior Art. Applicant argues that nowhere in

the background specification that applicant's claimed invention is disclosed.

However, please note that the background disclosure contains enough to lead to

applicant's claimed invention, at least, as recited in the above-noted claims.

Applicant argues that the claims require "detecting when a first process executing on a

first device releases access to shared data" and there is not a single mention of shared

data. Please note that the disclosure recites: "… a kernel preempts a first thread and

causes a processing device to execute a second thread, upon preemption of the second

thread, ***portions of the cache associated with that processing device may still***

***contain some or even all of the state information stored*** during the former execution

of the first thread. Clearly, it is suggested release of shared data or the used of shared

data. Further more the Background disclosure suggests the use or reuse of information

working-set or working data maintained in cache by multiple threads. The disclose

recites: "conventional affinity-based scheduling, a thread that executes on the same

processing device as was used for prior execution of that same thread may avoid cache

"misses" that would otherwise be needed to populate the cache with the threads

"working data"

> AAPA discloses, correspondingly, a conventional kernel that uses affinity-
> based scheduling in a multiprocessing computer system, the kernel thus
> attempts to restart a pre-empted thread on a processing device that is associated
> with the same cache that stored the execution state information for that thread
> during its former execution. A thread that is associated with the same cache that
> store execution state information of another thread suggest working shared
> information or data.
>
> Page 4 (lines 19-23) discusses the Kernel attempting to restart a pre-empted

thread on a processing device that is associated with the same cache that stored the

execution state information for that thread during its former execution, the kernel can

remove or preempt the executing thread from execution on the processing device and

can select and resume execution of another thread on that processing device.

In view of these remarks, it is maintained that claims 1-2, 6, 24-25, 29, and 47

are anticipated by Applicant's Background Art. The rejection with respect to these

claims is maintained and repeated below.

### Claim Rejections - 35 USC § 102

3.      The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that

form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (a) the invention was known or used by others in this country, or patented or described in a printed
> publication in this or a foreign country, before the invention thereof by the applicant for a patent.

4.      Claims 1-2, 6, 24-25, 29, and 47 rejected under 35 U.S.C. 102(a) as being

anticipated by Applicant's Admitted Prior art.

With respect to claims 1, 24 and 47, Applicant's Admitted Prior Art (AAPA)

discloses a method for identifying processes to be executed a multiprocessing computer

system having a plurality of processing devices, comprising:

detecting when a first process executing on a first processing device

releases access to shared data;

in response to the first process releasing access to the shared data,

attempting to identify a second process that:

i) formerly executed on the first processing device; and

ii) is awaiting access to the shared data; and

providing, to a kernel responsible for selecting processes to execute

amongst the plurality of processing devices, an identification of the second

process as a process that is ready for execution in the multiprocessing computer system.

AAPA discloses, correspondingly, a conventional kernel that uses affinity-based scheduling in a multiprocessing computer system, the kernel thus attempts to restart a pre-empted thread on a processing device that is associated with the same cache that stored the execution state information for that thread during its former execution (i.e. restarting a pre-empted thread meaning a process or thread that has been blocked during execution and is awaiting a chance for re-execution; in this case a block process automatically enters a queue of awaited processes awaiting execution).

Page 2 (lines 15-30) explicitly discusses the execution time slot for a thread to execute on a processing device. "When the time slot or an executing thread has expired, or if some other event such as an interrupt or a change in thread priority occurs, the kernel can remove or preempt the executing thread from execution on the processing device and can select and resume execution of another thread on that processing device. The kernel can perform this repetitive scheduling process involving thread selection and execution in a continuous manner for all processing devices in the multiprocessing computer system so that when a thread on one processing device is blocked from execution for some reason (e.g., because its timeslot ended, or it become blocked awaiting access to

shared memory or an input-output device or for some other reason), the kernel

can select another thread for execution on that processing device."

Page 2 (lines 10-14 explains that the processing device has knowledge of

the values for variables and/or other execution state information associated with

the thread (i.e. identification o the thread) for faster access when this information

is needed during execution of that thread as the processing device executes the

thread of instructions of a software program (see page 2, Lines 22-30; page 4,

lines 22-26).


Therefore,

(1) each thread of instructions that is awaiting its chance to execute is scheduled by the

kernel to execute on a processing device;

(2) the kernel, providing execution timing for each thread monitors when the time slot or

an executing time slot for a thread has expired;

(3) the kernel performs repetitive schedule and selection process and attempts to restart

a thread that has been blocked and is awaiting an access on the shared device.


With respect to claims 2 and 25, AAPA discloses conventional affinity-based thread

scheduling a thread that executes on the same processing device as was used for prior

execution such that each thread of instructions that is awaiting its chance to execute is

scheduled by the kernel to execute on the same processing device and the kernel

performs attempts to restart a thread that has been blocked and is awaiting a access on the shared device [Page 4, Lines 22-26].

With respect to claims 6 and 29, The method of claim 1 wherein attempting to identify a second process that formerly executed on the first processing device and that is awaiting to access shared data comprises: reviewing execution state associated with respective blocked processes awaiting access to the shared data; and if the execution state of a blocked process indicates that the blocked process formerly executed on the first processing device, identifying that blocked process as the second process [reviewing execution state associated with respective blocked processes awaiting access to the shared data; and if the execution state of a blocked process indicates that the blocked process formerly executed on the first processing device, identifying that blocked process as the second process (page 2, lines 22-30)]. Conventional kernels attempt to apply affinity-based scheduling to restart the pre-empted thread on any processing device core that accesses the same cache as the core that formerly executed that thread in the case of processing devices that are separate cores on a single die that share a common on-board cache.

### Allowable Subject Matter

5.      Claims 3-5, 7-19, 26-28, and 30-42 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

6.      Claims 20-23 43-46, and 48-49 are allowed.


7.      **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time

policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE

MONTHS from the mailing date of this action.  In the event a first reply is filed within

TWO MONTHS of the mailing date of this final action and the advisory action is not

mailed until after the end of the THREE-MONTH shortened statutory period, then the

shortened statutory period will expire on the date the advisory action is mailed, and any

extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

the advisory action.  In no event, however, will the statutory period for reply expire later

than SIX MONTHS from the mailing date of this final action.


### *Conclusion*

8.      The prior art made of record and not relied upon is considered pertinent to

applicant's disclosure.


9.      Any inquiry concerning this communication or earlier communications from the

examiner should be directed to Pierre-Michel Bataille whose telephone number is (571)

272-4178.  The examiner can normally be reached on Mon-Fri (8:00A to 4:30P).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's

supervisor, Matthew M. Kim can be reached on (571) 272-4182. The fax phone number

for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the

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published applications may be obtained from either Private PAIR or Public PAIR.

Status information for unpublished applications is available through Private PAIR only.

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you have questions on access to the Private PAIR system, contact the Electronic

Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a

USPTO Customer Service Representative or access to the automated information

system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Pierre-Michel Bataille
Primary Examiner
Art Unit 2186

**PIERRE BATAILLE**
**PRIMARY EXAMINER**

4\2\07